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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/247,816 02/09/99 DORBIE

A 20545.0006(1)

EXAMINER

WM01/0205

GRAHAM & JAMES
600 HANSEN WAY
PALO ALTO CA 94304-1043

CAO.L.H

ART UNIT

PAPER NUMBER

2671

DATE MAILED:

02/05/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/247,816

Applicant(s)

DORBIE, ANGUS

Examiner

Huedung X Cao

Art Unit

2671

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 June 1999.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aleksicy (#5,977,980) in view of Ouaknine et al. (#6,091,422).

As per claim 1 Aleksicy teaches a method for culling occluded objects from an image being rendered into a frame buffer, the method comprising the steps, performed by a host processor of:

constructing a coarse Z-buffer, the coarse Z-buffer subdivided into a series of tiles, each tile having an associated depth value (col. 2, lines 25-31, and fig. 1). It is noted that Aleksicy does not explicitly disclose the coarse Z-buffer subdivided into a series of tiles; however, Aleksicy's computer display being divided into a plurality of tiles suggests the same idea of dividing the Z-buffer into a series of tiles. Furthermore Ouaknine teaches that the step of dividing Z-buffer into a series of tiles is widely used in the art (Ouaknine, col. 9, lines 65-66). Thus, it would have been obvious to one of ordinary skill in the art to combine Ouaknine's teaching into Aleksicy's system by culling occluded objects to improve the efficiency of the video graphics.

updating the depth values of the coarse Z-buffer using Z information from the frame buffer (Aleknine, col. 2, lines 43-45); and

using the depth values to selectively discard objects from the image being rendered (Aleknine, col. 1, lines 36-39).

As per claim 2: updating depth values is performed synchronously as information in the frame buffer changes (Ouaknine, col. 7, lines 34-64).

As per claim 3: updating the depth values is performed asynchronously (Ouaknine, col. 5, lines 32-40).

As per claim 4: the step of using the depth values to selectively discard objects further comprises the steps of:

constructing a surrogate volume for an object (Aleknine, col. 3, lines 25-26) and Ouaknine teaches in col. 18-29; and

comparing the nearest Z-values of the surrogate volume to the depth value of a tile that includes the surrogate volume (Alekcisy, col. 3, line 33 to col. 4, line 7).

As per claim 5 and similar claim 7: a method in claim 4 further comprise the step of transforming the surrogate volume from object space to eye space (Ouaknine, figures 7a-7c).

As per claim 6 is similar to claim 4 and adding the step of retrieving the greatest depth value from the set of tiles that are spanned by the surrogate volume (Alekcisy, col. 3, lines 33-40).

As per claim 8: constructing a lower resolution coarse Z-buffer, the lower resolution coarse Z-buffer subdivide into a series of tiles, each tile having an associated depth value; and

updating the depth values of the lower resolution coarse Z-buffer using Z information from the frame buffer (Ouaknine, col. 8, lines 48-50).

As per claim 9: each tile in the lower resolution coarse Z-buffer covers the same screen area as each tile in the coarse Z-buffer (Ouaknine, col. 8, lines 48-64).

As per claim 10: the tiles in the lower resolution coarse Z-buffer are overlapping (Ouaknine, abstract).

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ashton (#5,729,672) teaches a method for projecting rays through an object represented by a set of infinite surfaces.

Greene et al. (35,600,763) teaches an error bounded antialiased rendering of complex scenes.

Takeda et al. (#5,522,018) teaches a sorting processing system and image synthesizing system using the same.

Piazza et al. (#6,091,428) teaches a frame buffer memory system for reducing page missed when rendering with color and z buffers

Kelleher et al. (#5,008,838) teaches a method for simultaneous initialization of a double buffer and frame buffer.

Wood (#5,953,014) teaches an image generation using three Z-buffers.

Art Unit: 2671

Inquires

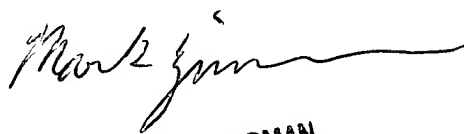
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Huedung Cao whose telephone number is (703) 308-5024. The examiner can normally be reached on Monday - Thursday from 6:30 am to 4:00 pm (EST). The examiner can also be reached on alternate Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman, can be reached on (703) 305-9798.

The fax number for the organization where this application or proceeding is assigned is (703) 308-6606.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-4700.

Huedung X. Cao
Patent Examiner


MARK ZIMMERMAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600